

**Project Title : CHP Analysis****Performer: American Council for an Energy Efficient Economy****ACEEE Contract :** Anna Shipley <ashipley@aceee.org>**Project Objective:** This project consists of 3 tasks:

*Utility Survey.* This task builds upon a 2002 survey of state legislation, environmental office and public utility commission regulations that apply to CHP. The new activity will focus on interconnection and tariff practices for major utilities. The results will be compiled into a database that will be made available on the Internet.

*Environmental Impacts.* One of the compelling benefits of CHP has been the promise of significant environmental benefits arising from the greater efficiency of the systems compared to separate heat and power systems. However, according to the national CHP roadmap, one of the barriers to the adoption of CHP is the sometimes lengthy and complicated siting and permitting process. Under this task, ACEEE will conduct a detailed review of existing CHP models such as IPM, ADER, and ORCHID. The results will be used to create a basic tool for determining local air impacts for state regulators and CHP installers. The goal of this work is to produce some basic rules of thumb for regulators and CHP system developers to estimate the general local environmental impact of a CHP system in a simple and timely manner.

*CHP Analysis Working Group.* In 1996, DOE, EPA, and ACEEE organized an ad hoc group of analysts to support the assessment of CHP as part of a national global climate strategy. The working group has made significant contributions to furthering CHP by connecting the CHP analysis community and coordinating research activities of the various participating groups to meet the analysis needs of the policy community. This task will provide for development and facilitation of Analysis Working Group Meetings.

**Project Title: CHP Technical Materials for Target National Accounts Market Sectors****Performer: American Gas Foundation****AGF Contact :** Walter Woods <wwoods@aga.org>**Project Objective:** This project consists of tasks focusing on National Accounts in the following areas: supermarkets, restaurants, health care, and hotels/motels:

Market segment reports - The proposed market segment reports will serve as an important management tool to fine-tune the final approach to each of the four key CHP markets. They will focus heavily on actions that manufacturers, utilities, associations and others need to undertake in order to see small CHP systems installed and specified by national account customers in the target segments.

Written materials for decision makers - Written materials for decision makers in the target segments that describe the benefits of small CHP systems in particular applications. Separate materials for the major target audiences in each segment will be prepared using message content drawn from the market segment reports, manufacturer information, and information from NAEA equipment installations. The materials will be made available on the NAEA website, and be used in direct mail and other communications.

Trade Show Exhibit Materials - Graphics will be developed specifically for each of the four market segments: restaurants and supermarkets, followed by health care and lodging.

**Project Title : CHP with Thermal Energy Storage and Turbine Inlet Cooling****Performer: Cool Solutions****Cool Solutions Contact :** John S. Andrepont <coolsolutions@aol.com>**Project Objective:** This project will result in a database of CHP projects that employ Thermal Energy Storage (TES) and Turbine Inlet Cooling (TIC). A summary report will be provided that includes: observations and

lessons learned from the demographics of the database, and conclusions regarding the market potential for CHP and DG when integrated with TES and/or TIC

**Project Title : CHP and DG Synergies and Alignment**

**Performer: Distributed Utility Associates**

**DUA Contact :** Joe Iannucci <joe@dual.com>

**Project Objective:** In this project, the vendor will use current contacts and leverage other ongoing efforts to complete data analysis and deliver periodic briefings on CHP and DER strategies. The primary topic of year one has been chosen: natural gas infrastructure issues for the market penetration of CHP and DG.

**Project Title : CHP Roadmap Technical Evaluation**

**Performer: Energetics**

**Energetics Contact :** Jan Brinch <jbrinch@energetics.com>

**Project Objective:** This project consists of several activities: technical analysis and planning of the CHP Roadmapping meetings and education and outreach activities to stakeholder groups.

**Project Title : Analysis of Industrial and Commercial CHP Markets**

**Performer: Energy and Environmental Analysis**

**EEA Contact :** Joel Bluestein <jbluestein@eea-inc.com>

**Project Objective:**

This subcontract consists of four distinct and separate tasks, including:

- Inventory of Existing Commercial/Industrial Boiler Population
- Evolution in the Demand for Steam
- Changing Applications for CHP
- Forecast of New and Conventional Industrial CHP

**Project Title : Analysis of Environmental Regulatory Barriers and Incentives for CHP**

**Performer: Energy and Environmental Analysis**

**EEA Contact :** Joel Bluestein <jbluestein@eea-inc.com>

**Project Objective:**

This subcontract consists of five distinct and separate tasks, including:

- Air Quality Permitting Barriers to CHP Development
- Application of Output-Based Air Quality Regulation for CHP
- CHP Emissions/Credit Calculator
- CHP Permitting and Regulatory Requirements Database
- Environmental Regulatory Analysis on CHP/DG Issues

**Project Title : CHP Applications and DG Analytical Support**

**Performer: Energy and Environmental Analysis**

**EEA Contact :** Bruce Hedman <bhedman@eea-inc.com>

**Project Objective:** This subcontract consists of five distinct and separate tasks, including:

- CHP Installation Database

- Applications Integration and Installed Costs Analysis for Small CHP Systems
- DG/CHP Financing and Ownership Options
- Electric Rate Primer
- Lessons Learned from Small CHP Projects

**Project Title : DG Operational Reliability Database Large CHP Market Analysis**

**Performer: Energy and Environmental Analysis**

**EEA Contact :** Paul Bautista <pbautista@eea-inc.com>

**Project Objective:** This project consists of two distinct and separate tasks:

- Enhancement to Distributed Generation Operational Reliability Database
- Large CHP Market Analysis

**Project Title : CHP Deployment in the Pacific Northwest**

**Performer : Subcontractor: Energy International**

**Energy International Contact :** Rick Tidball <rick.tidball@energyint.com>

**Project Objective:** This project focuses on the 4-state region comprising the Pacific Northwest: Washington, Oregon, Idaho, and Alaska. Three tasks will be completed: assessment of technical and market potential, technical tools and resource development, and an educational campaign.

**Project Title : Distributed Energy Resources in Metropolitan Planning**

**Performer: Gas Technology Institute**

**GTI Contact :** Doug Newman <Doug.Newman@gastechnology.org>

**Project Objective:** The objective of this project is to further the deployment of distributed energy resources (DER) in urban areas by integrating combined cooling, heating and power systems, into the planning of metropolitan infrastructure projects. Towards this end, this work will produce a national resources guide for sustainable metropolitan energy planning and a national model for sustainable urban design that include DER systems as a primary technology pathway to urban sustainability. The model design and the resources guide will be transferable to metropolitan communities located in any region of the country. These deliverables will constitute a significant contribution to the existing, but limited body of knowledge available to public officials, energy, environmental and planning authorities and private investment interests regarding sustainable urban development and DER technologies and systems.

The national guide and urban design model will also serve as the United States entry to the International Competition for Sustainable Urban System Design, the premier global initiative to stimulate new thinking and practices in metropolitan energy design, planning and management that will result in more livable cities around the world.

**Project Title : Development of a Preliminary Environmental Permitting Screening Tool**

**Performer: I.C. Thomasson Associates, Inc.**

**I.C. Thomasson Contact :** Jay Dyer <jdyer@icthomasson.com>

**Project Objective:** The purpose of this project is to develop an environmental permitting screening tool. The subcontractor shall investigate and document permitting procedures for each state of Environmental Protection Agency (EPA) Region 4: Southeast, serving Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. A computerized screening tool will be developed to assist users with permitting of any small gas turbine (1 MW to 5 MW) in any area of Region 4 with enough depth to cover the majority of

permitting conditions. Users will be able to identify applicable regulations and standards, as well as supplemental analyses required by the respective regulatory agency. Current contact persons, numbers, and web sites will be provided.

**Project Title : CHP Awareness and Barrier-Busting for Implementation of CHP in the District Energy Sector**

**Performer International District Energy Association**

**IDEA Contact :** Rob Thornton <rob.idea@districtenergy.org>

**Project Objective:** This project consists of 5 tasks:

- *Identify potential CHP candidates*
- *Initial Screening* – The CHP candidates will be ranked based on an overall project assessment including the following criteria: value of offset power purchases, value of offset thermal production, size of thermal and power loads and the relationship between the two, thermal and electric load factors, age of existing thermal capacity and plans for replacement or additional capacity, temperature/pressure of required thermal energy, fuel availability and costs, and capital and operating cost comparisons
- *Assess other market factors* - In addition to quantitative data, IDEA is assessing other factors affecting the likelihood of project success, such as endorsement or level of project support in the organization; permitting status and timing; funding capability or credit-worthiness; project visibility; project support or opposition; timing on capital replacement needs; load growth timing.
- *Analysis and ranking of high probability candidates* – A second-level analysis will be performed on selected high probability candidates from all segments: institutions, hospitals, airports and utility systems. In these analyses, IDEA will gather and analyze additional information about thermal and electric loads, policies, standards and tariffs of the local utility relative to interconnection and back-up power, siting issues, environmental permitting constraints, fuel costs, and financing constraints. An important element will be analysis and coordination with ORNL in use of financial review tools.
- *Technical analysis and assistance*

**Project Title : CHP Applications and DER Regional and State Initiatives**

**Performer: Northeast Midwest Institute**

**NEMW Contact:** Suzanne Watson <swatson@nemw.org>

**Project Objective:** This project consists of three tasks:

*Build and Support Regional & State CHP/DER Initiatives*

Create a National CHP/DER Coalition Board, host/facilitate regular meetings among all regional groups and attend individual regional CHP meetings, monitor and analyze regional CHP materials, create and organize an annual meeting of regional CHP groups, create/organize regional efforts for CHP Roadmap and Policy Conferences, coordinate state level efforts to remove barriers through coordination of formal comment preparation and meetings with state PUCs, environmental regulators, state legislators, industry, etc.

*Manufacturing Sector Initiatives*

(Note that “manufacturing sector” does not mean CHP equipment manufacturers, but rather the US manufacturing sector). Utilize the existing Northeast-Midwest Manufacturing Task Force to reach potential end-users by holding two targeted DER/CHP workshops in Chicago and Boston regions working with the DOE Regional Offices to specifically highlight the benefits of CHP/DER to manufacturers; and by working to include representation from the manufacturing industry and the DOE Industries of the Future (IOF) program in the MW and NE CHP Initiatives.

### *Commercial Sector Initiatives*

Enlist major, national real estate developers in an educational process to encourage others to consider on-site energy generation. Present at least one panel session at the national Real Estate Roundtable forum and work with specific developers who are ready to present successful examples of case studies to peers and to policymakers on the web site and in presentations.

**Project Title : Developing CHP Market Potential with Opportunity Fuels**

**Performer: Resource Dynamics Corporation**

**Resource Dynamics Contact :** Paul Lemar < pll@rdcnet.com >

**Project Objective:** This project consists of three tasks:

*Collect Opportunity Fuels Information* - This task will collect and summarize opportunity fuels information for fuels that already are or could be used in Combined Cooling, Heat, and Power (CHP) applications. Existing relevant studies will be reviewed. Interviews with CHP and Distributed Generation(DG) unit manufacturers and DG installers will be made to learn their experience with the use of opportunity fuels. The project team will use this information to describe the quality characteristics of the available opportunity fuel sources, their potential suitability as a CHP or DG fuel and their potential environmental implications. Rough supply availability and cost estimates for each reasonably suitable and available opportunity fuel will be developed. The results will also indicate areas of geographic concentration by region.

*Evaluate CHP Technology Options* - The set of CHP and DG technologies and applications that might benefit from use of opportunity fuels will be analyzed. The technologies considered will include reciprocating engines, microturbines, the Advanced Turbine Systems (ATS), and biomass converters, plus other technology options to be identified. From these, a set of cost, performance, efficiency and emissions data will be developed for each generator type consuming a particular opportunity fuel. Resource Dynamics will analyze the collected information to ascertain the most likely technologies to pursue.

*Analyze Potential Market Impacts and Develop Recommendations* - Scenario analyses will be performed with the DISPERSE model to examine in detail the influence of various opportunity fuel's use in its partnered generator set technology.

Using the results of all three tasks, recommendations and conclusions will be drawn addressing barriers that are presently impeding expanded use of these technologies and opportunity fuels, and discussing potential solutions for barrier removal. The DOE and Federal and state regulators can use the results to better deploy their resources.

**Project Title : A Review of Distributed Generation Siting Procedures**

**Performer: Resource Dynamics Corporation**

**Resource Dynamics Contact :** Paul Lemar < pll@rdcnet.com >

**Project Objective:** This project consists of three tasks:

*Collect Siting Data* – Resource Dynamics will collect financial case study information from and about a wide selection of DG and CHP installations. The focus will be on what steps the developer needed to take to complete the installation, how long each step took, and the cost to conduct each task. Barriers faced and actions taken to successfully mitigate these barriers will be identified. Additional information about the historical number of DG and CHP siting requests will be collected by reviewing state permitting databases from those leading states that compile this information. Resource Dynamics will conduct interviews with representatives of relevant trade associations to ascertain their views on siting costs, process timelines, barriers, and ways to eliminate barriers. Summaries of the information already collected will be presented to them for their review and response. The results of this task will provide a baseline for estimating both siting costs and timeframe by type of project, project size and project location.

*Perform Siting Trends Analysis* - Trends in each of the following 3 tracks will be analyzed to determine what impact they have on siting costs: 1. Site analysis including engineering feasibility and financing, 2. Permitting including an environmental analysis, air permit, zoning permit, building and construction permits, and 3. Interconnection including engineering, inspection and coordination with the local distribution utility.

*Analyze Siting Procedures and Make Recommendations* – Based on the results of this project evaluation, the vendor will prepare recommendations of ways regulators might help improve the siting process, and ways end-users and ISPs might minimize costs when installing DG and CHP units.

**Project Title : Targeted CHP Outreach in Selected Sectors of the Commercial Market**

**Performer: University of Illinois at Chicago**

**UIC Contact :** Bill Ryan <wryan@uic.edu>

**Project objective:** To develop focused outreach material and programs for three selected segments of the commercial buildings market. The "Target" market segments for this effort are:

- Smaller Hospitals and Clinics
- Educational Buildings K-12
- Data Centers/Server Farms/Telecom Switching Centers

A market segment study will be done to accurately target education and outreach efforts to each of the three market segments. This study will focus on: determining the overall size and detailed demographics of each segment, identifying professional organizations, and if possible the largest market participants, determining current market issues, and changes in the market, and determining the preferred information sources, decision making and buying process for equipment

The output of this project will be in the form of a market study report and contact lists: The report will include specific information on: type of building systems these segments currently prefer, who the major facility owners are in these markets, profiles of the major operating issues in these markets, and how best to reach decision makers within these segments.

**Project Title : CHP Educational Campaign to Member Stakeholders**

**Performer: US Combined Heat & Power Association**

**USCHPA Contact :** John Jimison <jjimison@cmcklaw.com>

**Project Objective:** This project consists of three tasks:

*Technical Analysis* - A list of up to eight end-use sub-sectors with high potential for CHP use will be developed. USCHPA will prepare a presentation on CHP to association boards of directors, alert them to CHP projects already established in their industries, and cultivate interest and relationships. USCHPA will collaborate with the Washington, DC offices of these associations.

*Build and strengthen relationships with industry representatives and associations* – USCHPA will contact association leaders to identify specific obstacles to implementing CHP in specified sectors. The barriers will be assessed to determine practical means of overcoming them. The advantages of CHP, including increased efficiency, cost-effective cooling, increased power reliability, a hedge against fluctuating electric prices, etc. will be evaluated. USCHPA will work with service organizations, such as building code groups, financial service groups, and architectural and engineering groups, that typically would be involved in implementing CHP.

*Information Dissemination to Association Members* – USCHPA will conduct information dissemination activities to association members using existing generic information and information prepared for specific sectors. The vendor will: develop, lay out, and produce up to eight industry-specific pamphlets on the practicality of using

CHP in that sector, highlighting early case studies or examples, and proposing specific means of overcoming barriers to CHP use in that sector, identify dissemination vehicles and mechanisms (e.g., Web sites and newsletters) for broad distribution by USCHPA, DOE, EPA, IDEA, FEMP, and relevant associations representing end-use sectors with high potential for CHP utilization, attend scheduled trade association meetings and conferences, seek strategic opportunities to speak at such meetings, display USCHPA exhibits at industry trade shows, participate in energy-oriented panels, and send literature to conference attendees after such meetings, and post the names of interested companies or development partners on the business opportunities page of USCHPA's Web site, allowing USCHPA member companies to contact these people for prospective partnering opportunities.

*Tool Kit for Industrial Technologies* – USCHPA will team with ORNL and the Offices of Distributed Energy Resources and Industrial Technologies to identify tools available to support CHP efforts in the Industrial area and to identify partnering activities which will advance the project goals.